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EXAMINER

CHEN, QING

ART UNIT

PAPER NUMBER

2191

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                  |  |
|------------------------------|--------------------------------------|----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/611,815 | <b>Applicant(s)</b><br>LE ET AL. |  |
|                              | <b>Examiner</b><br>Qing Chen         | <b>Art Unit</b><br>2191          |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-16, 18-25 and 27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-16, 18-25 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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### **DETAILED ACTION**

1. This Office action is in response to the amendment filed on March 31, 2009.
2. **Claims 2-16, 18-25, and 27** are pending.
3. **Claims 2, 14, 18, 21, and 27** have been amended.
4. **Claims 1, 17, 26, and 28-52** have been canceled.
5. The objections to Claims 21 and 27 are withdrawn in view of Applicant's amendments to the claims. However, Applicant's amendments to the claims fail to fully address the objection to Claim 18 due to a typographical error. Accordingly, this objection is maintained and further explained hereinafter.
6. The 35 U.S.C. § 112, second paragraph, rejection of Claim 27 is withdrawn in view of Applicant's amendments to the claim. However, the 35 U.S.C. § 112, second paragraph, rejection of Claim 16 is maintained in view of Applicant's arguments and further explained hereinafter.

### ***Response to Amendment***

#### ***Claim Objections***

7. **Claim 18** is objected to because of the following informalities:
  - **Claim 18** contains a typographical error: "[L]oopback" should read -- loop-back --.Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. **Claim 16** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 16** recites the limitation “the imaging client” in “mediating [...] sector-based I/O requests between the imaging client and the source disk.” There is insufficient antecedent basis for the limitation “the imaging client” in the claim. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “the imaging client program” for the purpose of further examination.

### ***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. **Claims 2-5 and 18-20** are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,477,624 (hereinafter “**Kedem**”).

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As per **Claim 3**, Kedem discloses:

- loop-back mounting a simulated source disk in the second computer so that the simulated source disk is accessible by the operating system as a local disk (*see Column 8: 26-28, "To OS 102 and BIOS 104, LDIM 202 "pretends" that it is storage device 110. Thus, LDIM 202 is completely transparent to OS 102 and BIOS 104."; Column 9: 2-4, "In the former case, LDIM 202 emulates the selected image including the geometry of the image."*); [Examiner's Remarks: Note that the LDIM is clearly being "loop-back" mounted since it involves "the process of taking a file (disk image) and presenting it as a physical disk (emulating the disk image) to the operating system" as defined in paragraph [0152] of the specification.] and
- configuring the simulated source disk as a proxy for the source disk by intercepting sector-based I/O requests directed to the simulated source disk and retrieving source disk data from the source disk according to the intercepted sector-based I/O requests (*see Column 3: 62-67 to Column 4: 1-3, "The purpose of the LDIM is to imitate the LPSD. That is, the LDIM, from the computer's perspective, appears exactly like the LPSD. More specifically, the LDIM functions to intercept and process requests that are intended to be received by the LPSD, which may not be in fact installed in the computer."; Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data." and 28-32, "If LDIM 202 determines that the cached data image has the most up to date version of the requested data, then LDIM 202 retrieves the requested data from storage device 110 and passes the data back to the component or device*

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*from which it received the request.”; Column 13: 66 and 67 to Column 14: 1 and 2, “Another approach is to add the interception and implementation of the LDIM onto the physical persistent storage device 110. This functionality would be added before the device's controller (not shown) handles requests.”).*

As per **Claim 2**, the rejection of **Claim 3** is incorporated; and Kedem further discloses:

- populating a destination image with extracted contents of the source disk in which the destination image has files, attributes, and structural relationships between files identical to files associated with the source disk (*see Column 1: 29-38, “The contents of the hard disk (also referred to as the hard disk's "disk image" or "data image") define the user's personalized environment: ...” and 53-62, “When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image."”*).

As per **Claim 4**, the rejection of **Claim 3** is incorporated; and Kedem further discloses:

- forwarding the intercepted sector-based I/O requests to the first computer over a network (*see Column 10: 19-20, “In this situation, LDIM 202 merely forwards all read/write requests to the appropriate RDIM 204.”*).

As per **Claim 5**, the rejection of **Claim 4** is incorporated; and Kedem further discloses:

- loading an imaging client program in the memory of the first computer, the imaging client program not being resident on the source disk (*see Column 9: 65-67, “RDIM 204*

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*preferably includes image manipulation tools. The image manipulation tools allow system administrators to manipulate master data images stored on RPSD 206.”); and*

- passing the intercepted sector-based I/O requests to the imaging client program, the imaging client program directing the intercepted sector-based I/O requests to the source disk (*see Column 10: 26-29, “It should also be noted that the propagation of write requests from LDIM 202 to RDIM 204 for the purpose of updating the master data image can be timed to best utilize the network bandwidth.”*).

As per **Claim 18**, Kedem discloses:

- a first computer having the source disk (*see Column 8: 6-7, “The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204.”*); and

- a second computer having a memory with an operating system and an imaging server residing therein, the imaging server including computer executable instructions having code to create a simulated source disk that is a representation of information stored on the source disk and is accessed by the operating system as a local disk; and code to mount the simulated source disk in the second computer, with said memory including file system drivers to detect a file system of the simulated source disk and a network loop-back driver intercepting sector-based I/O requests directed to the simulated source disk and retrieving source disk data from the source disk according to intercepted sector-based I/O requests intercepted by the network loop-back driver (*see Column 1: 29-38, “The contents of the hard disk (also referred to as the hard disk's "disk image" or "data image") define the user's personalized environment: ...” and 53-62, “When the persistent storage device is a hard disk, the persistent storage device data image will*

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*frequently be called a "disk image.""; Column 3: 62-67 to Column 4: 1-3, "The purpose of the LDIM is to imitate the LPSD. That is, the LDIM, from the computer's perspective, appears exactly like the LPSD. More specifically, the LDIM functions to intercept and process requests that are intended to be received by the LPSD, which may not be in fact installed in the computer."; Column 6: 17-19, "... the operating system directs the request to an appropriate device driver for the physical device to which the request was made."; Column 8: 6-7, "The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204." and 19-21, "LDIM 202, as shown in FIG. 2, communicates with OS 102 and BIOS 104 using standard interface 112 ..." and 26-28, "To OS 102 and BIOS 104, LDIM 202 "pretends" that it is storage device 110. Thus, LDIM 202 is completely transparent to OS 102 and BIOS 104." and 43-44, "... LDIM 202 includes a "mini-booter" software program (not shown)." and 47-48, "This is done by emulating a disk with the mini-booter installed as a loader." and 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image." and 2-4, "In the former case, LDIM 202 emulates the selected image including the geometry of the image." and 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data." and 28-32, "If LDIM 202 determines that the cached data image has the most up to date version of the requested data, then LDIM 202 retrieves the requested data from*



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*storage device 110 and passes the data back to the component or device from which it received the request.”; Column 13: 66 and 67 to Column 14: 1 and 2, “Another approach is to add the interception and implementation of the LDIM onto the physical persistent storage device 110. This functionality would be added before the device's controller (not shown) handles requests.”).*

As per **Claim 19**, the rejection of **Claim 18** is incorporated; and Kedem further discloses:

- a network adapter, residing in said memory, to forward the intercepted sector-based I/O requests to the first computer (*see Column 10: 19-20, “In this situation, LDIM 202 merely forwards all read/write requests to the appropriate RDIM 204.” and 49-51, “LDIM card 308 is equipped with an embedded processor, logic circuits, and memory 310 for enabling LDIM 202 to perform its functions.”*).

As per **Claim 20**, the rejection of **Claim 19** is incorporated; and Kedem further discloses:

- a first computer memory within the first computer (*see Figure 1: 110*); and
- an imaging client installed in the first computer memory (*see Column 9: 65-67, “RDIM 204 preferably includes image manipulation tools. The image manipulation tools allow system administrators to manipulate master data images stored on RPSD 206.”*), said imaging client comprising computer-executable instructions that include code to receive any source disk I/O requests issued from the second computer to the first computer, code to direct the intercepted sector-based I/O requests to the source disk, and code to pass the retrieved source disk data to the second computer in response to the source disk I/O requests (*see Column 9: 9-15, “... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received*

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*by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data.” and 28-32, “If LDIM 202 determines that the cached data image has the most up to date version of the requested data, then LDIM 202 retrieves the requested data from storage device 110 and passes the data back to the component or device from which it received the request.”; Column 10: 26-29, “It should also be noted that the propagation of write requests from LDIM 202 to RDIM 204 for the purpose of updating the master data image can be timed to best utilize the network bandwidth.”).*

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kedem** in view of **US 7,000,231 (hereinafter “Gold”)**.

As per **Claim 6**, the rejection of **Claim 5** is incorporated; however, Kedem does not disclose:

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- loading a secondary operating system in the memory of the first computer, said secondary operating system not being present on the source disk and mediating I/O requests between an imaging client program and the source disk.

Gold discloses:

- loading a secondary operating system in a memory of a first computer, said secondary operating system not being present on a source disk and mediating I/O requests between an imaging client program and the source disk (*see Figure 4; Column 3: 23-28, "A utility can then be used to reset a system identification of the computer entity, before switching to a secondary operating system to complete a build process." and 38-40, "A build process under control of a secondary "emergency" operating system can copy a fully installed primary operating system onto an operating system back-up volume."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Gold into the teaching of Kedem to modify Kedem's invention to include loading a secondary operating system in the memory of the first computer, said secondary operating system not being present on the source disk and mediating I/O requests between an imaging client program and the source disk. The modification would be obvious because one of ordinary skill in the art would be motivated to guarantee creation of an uncorrupted complete copy of the primary operating system (*see Gold – Column 3: 41-43*).

14. **Claims 7, 8, 12, 13, 15, 16, 21-23, and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kedem** in view of **US 5,991,542 (hereinafter "Han")**.

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As per **Claim 7**, the rejection of **Claim 2** is incorporated; and Kedem further discloses:

- mounting the destination image in an uninitialized state in the second computer as a simulated destination disk *(see Column 8: 63-67 to Column 9: 1, “The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image.”)*;
- intercepting sector-based I/O requests directed to the simulated destination disk and directing the contents of the intercepted sector-based I/O requests to the destination image *(see Column 9: 9-15, “... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data.”)*; and
- copying files of at least one file system of the simulated source disk to the corresponding file system of the simulated destination disk *(see Column 9: 48-51, “It is envisioned that a user who uses the DIMS would initially copy the data image stored on storage device 110 onto RPSD 206 and then always select that image as the master data image.”)*.

However, Kedem does not disclose:

- retrieving partition and file system layout information from the source disk; and
- formatting the simulated destination image to have the same partitioning and file system(s) as the simulated source disk and thus of the source disk.

Han discloses:

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- retrieving partition and file system layout information from a source disk (*see Column 4: 41-44, "A larger storage device, such as a hard disk or a file server, can be divided into many different volumes, or partitions, each of which can be formatted in a different manner."*); and
- formatting a simulated destination image to have the same partitioning and file system as a simulated source disk and thus of the source disk (*see Column 4: 37-39, "In essence, a volume can be any piece of a storage medium, such as a disk, which is formatted to contain files. A volume can be an entire disk, or only part of a disk."* and 61-67, "The volume information in logical block 2 comprises various fields that are used by the operating system's file management facility, such as the volume name, its size, and the number of files on the volume. This information is initially created when the volume is initialized, or formatted, and modified thereafter whenever the file management system writes information to the volume.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Han into the teaching of Kedem to modify Kedem's invention to include retrieving partition and file system layout information from the source disk; and formatting the simulated destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk. The modification would be obvious because one of ordinary skill in the art would be motivated to create a disk image that has properties of the physical storage device being simulated so that the disk image can be mounted on other computer systems (*see Han – Column 3: 30-34*).

As per **Claim 8**, the rejection of **Claim 7** is incorporated; and Kedem further discloses:

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- converting the intercepted sector-based I/O requests to the simulated destination disk into sector accesses within the destination image (*see Column 9: 36-39, "Upon receiving the read request, RDIM 204 locates and reads the requested data from the selected master data image stored on RPSD 206 and then transmits the data back to LDIM 202."*).

As per **Claim 12**, the rejection of **Claim 7** is incorporated; and Kedem further discloses:

- in which the source disk is a source virtual disk (*see Column 1: 53-62, "When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image.""*).

As per **Claim 13**, the rejection of **Claim 12** is incorporated; and Kedem further discloses:

- in which the destination disk is a physical disk (*see Figure 1: 110*).

As per **Claim 15**, the rejection of **Claim 7** is incorporated; and Kedem further discloses:

- in which the first computer is the same as the second computer (*see Column 8: 6-7, "The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204."*).

As per **Claim 16**, Kedem discloses:

- in a second computer that includes an operating system that has file system software that detects a file system of disks mounted in the second computer, while the source disk is in an unmodified, unprepared state, extracting the contents of the source disk, defining extracted contents, and populating a destination image with the extracted contents of the source disk such

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that the destination image may have a different sector-by-sector content than the source disk but a destination file system logically equivalent to the at least one source file system, with identical files, attributes, and structural relationships between files as the source disk (*see Column 1: 29-38, "The contents of the hard disk (also referred to as the hard disk's "disk image" or "data image") define the user's personalized environment: ..." and 53-62, "When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image.""; Column 8: 6-7, "The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204."*);

- mounting a simulated source disk in the second computer so that the simulated source disk is accessible by the operating system as a local disk (*see Column 8: 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image."*);

- configuring the simulated source disk as a proxy for the source disk by intercepting sector-based I/O requests directed to the simulated source disk and retrieving source disk data from the source disk according to the intercepted sector-based I/O requests (*see Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data."* and 28-32, *"If LDIM 202 determines that the cached data image has the most up to date version*

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*of the requested data, then LDIM 202 retrieves the requested data from storage device 110 and passes the data back to the component or device from which it received the request.”);*

- forwarding the intercepted sector-based I/O requests to the first computer (*see Column 10: 19-20, “In this situation, LDIM 202 merely forwards all read/write requests to the appropriate RDIM 204.”);*

- loading an imaging client program into a memory of the first computer (*see Column 9: 65-67, “RDIM 204 preferably includes image manipulation tools. The image manipulation tools allow system administrators to manipulate master data images stored on RPSD 206.”);*

- passing the intercepted sector-based I/O requests to the imaging client program, the imaging client program directing the intercepted sector-based I/O requests to the source disk (*see Column 10: 26-29, “It should also be noted that the propagation of write requests from LDIM 202 to RDIM 204 for the purpose of updating the master data image can be timed to best utilize the network bandwidth.”);*

- mediating, by the operating system, sector-based I/O requests between the imaging client program and the source disk (*see Column 6: 12-18, “1. An application wishing to read or write a file issues a request to an operating system API for such action.” and “3. On a miss, or write through, the operating system directs the request to an appropriate device driver for the physical device to which the request was made.”; Column 8: 19-21, “LDIM 202, as shown in FIG. 2, communicates with OS 102 and BIOS 104 using standard interface 112 ...”; Column 9: 9-11, “As is evident from FIG. 2, LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110.”);*



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- mounting the destination image in an uninitialized state in the second computer as a simulated destination disk (*see Column 8: 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image."*);
- intercepting sector-based I/O requests directed to the simulated destination disk and directing results of the intercepted sector-based I/O requests to the destination image (*see Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data."*);
- converting the intercepted sector-based I/O requests to the simulated destination disk into sector accesses within the destination image (*see Column 9: 36-39, "Upon receiving the read request, RDIM 204 locates and reads the requested data from the selected master data image stored on RPSD 206 and then transmits the data back to LDIM 202."*); and
- copying files of at least one file system of the simulated source disk to the corresponding file system of the simulated destination disk (*see Column 9: 48-51, "It is envisioned that a user who uses the DIMS would initially copy the data image stored on storage device 110 onto RPSD 206 and then always select that image as the master data image."*).

However, Kedem does not disclose:

- retrieving partition and file system layout information from the source disk; and

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- formatting the simulated destination image to have the same partitioning and file system(s) as the simulated source disk and thus of the source disk.

Han discloses:

- retrieving partition and file system layout information from a source disk (*see Column 4: 41-44, "A larger storage device, such as a hard disk or a file server, can be divided into many different volumes, or partitions, each of which can be formatted in a different manner."*); and

- formatting a simulated destination image to have the same partitioning and file system(s) as a simulated source disk and thus of the source disk (*see Column 4: 37-39, "In essence, a volume can be any piece of a storage medium, such as a disk, which is formatted to contain files. A volume can be an entire disk, or only part of a disk."* and *61-67, "The volume information in logical block 2 comprises various fields that are used by the operating system's file management facility, such as the volume name, its size, and the number of files on the volume. This information is initially created when the volume is initialized, or formatted, and modified thereafter whenever the file management system writes information to the volume."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Han into the teaching of Kedem to modify Kedem's invention to include retrieving partition and file system layout information from the source disk; and formatting the simulated destination image to have the same partitioning and file system(s) as the simulated source disk and thus of the source disk. The modification would be obvious because one of ordinary skill in the art would be motivated to create a disk image that has properties of the physical storage device being simulated so that the disk image can be mounted on other computer systems (*see Han – Column 3: 30-34*).

As per **Claim 21**, the rejection of **Claim 18** is incorporated; and Kedem further discloses:

- wherein the imaging server further includes code to generate a simulated destination disk in response to the second computer mounting the destination image, with said memory further including a local loop-back driver, a local adapter and a formatting module, with the local loop-back driver intercepting sector-based I/O requests directed to the simulated destination disk and the local adapter comprising code to convert the intercepted sector-based I/O requests to the simulated destination disk into sector accesses within the destination image, the imaging server having code to copy files of at least one file system of the simulated source disk to the corresponding file system of the simulated destination disk (*see Column 8: 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image."*; Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data." and 36-39, "Upon receiving the read request, RDIM 204 locates and reads the requested data from the selected master data image stored on RPSD 206 and then transmits the data back to LDIM 202." and 48-51, "It is envisioned that a user who uses the DIMS would initially copy the data image stored on storage device 110 onto RPSD 206 and then always select that image as the master data image.").

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However, Kedem does not disclose:

- the local loop-back driver retrieving partition and file system layout information from the source disk; and
- the formatting module comprising code to format the destination image to have the same partitioning and file system(s) as the simulated source disk and thus of the source disk.

Han discloses:

- a local loop-back driver retrieving partition and file system layout information from a source disk (*see Column 4: 41-44, "A larger storage device, such as a hard disk or a file server, can be divided into many different volumes, or partitions, each of which can be formatted in a different manner."*); and
- a formatting module comprising code to format a destination image to have the same partitioning and file system(s) as a simulated source disk and thus of the source disk (*see Column 4: 37-39, "In essence, a volume can be any piece of a storage medium, such as a disk, which is formatted to contain files. A volume can be an entire disk, or only part of a disk." and 61-67, "The volume information in logical block 2 comprises various fields that are used by the operating system's file management facility, such as the volume name, its size, and the number of files on the volume. This information is initially created when the volume is initialized, or formatted, and modified thereafter whenever the file management system writes information to the volume."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Han into the teaching of Kedem to modify Kedem's invention to include the local loop-back driver retrieving partition and file system

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layout information from the source disk; and the formatting module comprising code to format the destination image to have the same partitioning and file system(s) as the simulated source disk and thus of the source disk. The modification would be obvious because one of ordinary skill in the art would be motivated to create a disk image that has properties of the physical storage device being simulated so that the disk image can be mounted on other computer systems (*see Han – Column 3: 30-34*).

As per **Claim 22**, the rejection of **Claim 21** is incorporated; and Kedem further discloses:

- in which the source disk is a virtual disk (*see Column 1: 53-62, “When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a “disk image.”*”).

As per **Claim 23**, the rejection of **Claim 22** is incorporated; and Kedem further discloses:

- in which the destination disk is a physical disk (*see Figure 1: 110*).

As per **Claim 27**, Kedem discloses:

- a second computer (*see Column 8: 6-7, “The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204.”*);

- a server operating system that resides in the second computer (*see Column 8: 6-7, “The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204.”*);

- file system drivers within the server operating system of the second computer automatically detecting at least one file system of disks mounted in the second computer (*see*

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*Column 6: 17-19, "... the operating system directs the request to an appropriate device driver for the physical device to which the request was made. ");*

- an imaging server running within the second computer (*see Column 8: 43-44, "... LDIM 202 includes a "mini-booter" software program (not shown). "*) and comprising computer-executable instructions:

- for extracting the contents of the source disk, defining extracted contents, and populating a destination image with the extracted contents of the source disk such that the destination image may have a different sector-by-sector content than the source disk but a destination file system logically equivalent to the at least one source file system (*see Column 1: 29-38, "The contents of the hard disk (also referred to as the hard disk's "disk image" or "data image") define the user's personalized environment: ..." and 53-62, "When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image."");*

- for creating a simulated source disk corresponding to the source disk (*see Column 8: 47-48, "This is done by emulating a disk with the mini-booter installed as a loader."");*

- while the source disk is in an unmodified, unprepared state, for mounting the simulated source disk in the second computer, file system drivers thereby automatically detecting a file system of the simulated source disk and therefore of the source disk and exposing a file system to software running on the second computer (*see Column 8: 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image."");*

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- a network loop-back driver intercepting sector-based I/O requests directed to the simulated source disk (*see Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data."*);
- a network adapter forwarding the intercepted sector-based I/O requests to the first computer (*see Column 10: 19-20, "In this situation, LDIM 202 merely forwards all read/write requests to the appropriate RDIM 204."*);
- an imaging client installed in the memory of the first computer (*see Column 9: 65-67, "RDIM 204 preferably includes image manipulation tools. The image manipulation tools allow system administrators to manipulate master data images stored on RPSD 206."*), said imaging client comprising computer-executable instructions:
  - for receiving any source disk I/O requests issued from the second computer to the first computer (*see Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110."*),
  - for directing the intercepted sector-based I/O requests to the source disk (*see Column 9: 9-15, "After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data."*), and
  - for passing to the second computer source disk data retrieved in response to the source disk I/O requests (*see Column 9: 28-32, "If LDIM 202 determines that the cached data*

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*image has the most up to date version of the requested data, then LDIM 202 retrieves the requested data from storage device 110 and passes the data back to the component or device from which it received the request.”; Column 10: 26-29, “It should also be noted that the propagation of write requests from LDIM 202 to RDIM 204 for the purpose of updating the master data image can be timed to best utilize the network bandwidth.”);*

- a local loop-back driver intercepting sector-based I/O requests directed to the simulated destination disk (see Column 9: 9-15, “... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data.”);

- a local adapter comprising computer-executable instructions for converting the intercepted sector-based I/O requests to the simulated destination disk into sector accesses within the destination image (see Column 9: 36-39, “Upon receiving the read request, RDIM 204 locates and reads the requested data from the selected master data image stored on RPSD 206 and then transmits the data back to LDIM 202.”); and

- the imaging server further comprising computer-executable instructions for copying files of at least one file system of the simulated source disk to the corresponding file system of the simulated destination disk (see Column 9: 48-51, “It is envisioned that a user who uses the DIMS would initially copy the data image stored on storage device 110 onto RPSD 206 and then always select that image as the master data image.”).

However, Kedem does not disclose:



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- a simulated destination disk generated by mounting the destination image in an uninitialized state in the second computer;
- a local loop-back driver retrieving partition and file system layout information from the source disk; and
- a formatting module comprising computer-executable instructions for formatting the destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk.

Han discloses:

- a simulated destination disk generated by mounting a destination image in an uninitialized state in a second computer (*see Column 4: 23-26, "In accordance with the present invention, the efficiency with which the downloading operation can be carried out is enhanced by making the disk image file mountable in each target computer 10."*);
- a local loop-back driver retrieving partition and file system layout information from a source disk (*see Column 4: 41-44, "A larger storage device, such as a hard disk or a file server, can be divided into many different volumes, or partitions, each of which can be formatted in a different manner."*); and
- a formatting module comprising computer-executable instructions for formatting the destination image to have the same partitioning and file system as a simulated source disk and thus of the source disk (*see Column 4: 37-39, "In essence, a volume can be any piece of a storage medium, such as a disk, which is formatted to contain files. A volume can be an entire disk, or only part of a disk."* and 61-67, *"The volume information in logical block 2 comprises various fields that are used by the operating system's file management facility, such as the*

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*volume name, its size, and the number of files on the volume. This information is initially created when the volume is initialized, or formatted, and modified thereafter whenever the file management system writes information to the volume.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Han into the teaching of Kedem to modify Kedem's invention to include a simulated destination disk generated by mounting the destination image in an uninitialized state in the second computer; a local loop-back driver retrieving partition and file system layout information from the source disk; and a formatting module comprising computer-executable instructions for formatting the destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk. The modification would be obvious because one of ordinary skill in the art would be motivated to create a disk image that has properties of the physical storage device being simulated so that the disk image can be mounted on other computer systems (*see Han – Column 3: 30-34*).

15. **Claims 9-11 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kedem** in view of **Han** as applied to Claims 7 and 21 above, and further in view of **US 6,075,938 (hereinafter “Bugnion”)**.

As per **Claim 9**, the rejection of **Claim 7** is incorporated; however, Kedem and Han do not disclose:

- in which the destination image is a virtual disk file associated with a virtual computer.

Bugnion discloses:

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- in which a destination image is a virtual disk file associated with a virtual computer (see Column 10: 5-7, “Disco virtualizes disks by providing a set of virtual disks that any virtual machine can mount.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Bugnion into the teaching of Kedem to modify Kedem’s invention to include in which the destination image is a virtual disk file associated with a virtual computer. The modification would be obvious because one of ordinary skill in the art would be motivated to utilize a virtual disk file to support different sharing and persistency models (see Bugnion – Column 10: 7-8).

As per **Claim 10**, the rejection of **Claim 9** is incorporated; and Kedem further discloses:

- in which the first computer is a physical computer and the source disk is a physical disk associated with the physical computer (see Column 8: 6-7, “The DIMS is 110 a client/server system, and thus includes a client 202 and a server 204.” and 10-12, “The DIMS also includes a persistent storage device (PSD) 206 that can be read from and written to by RDIM 204.”).

As per **Claim 11**, the rejection of **Claim 9** is incorporated; however, Kedem and Han do not disclose:

- in which the virtual disk file is a sparse virtual disk, having a predetermined capacity and initial sector contents with null values.

Official Notice is taken that it is old and well-known within the computing art to utilize a sparse virtual disk. Applicant has submitted in the “Background of the Invention” section of the

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specification that a VMM may implement a virtual disk using a sparse, sector-based image format (*see Page 21, Paragraph [0094]*). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in which the virtual disk file is a sparse virtual disk, having a predetermined capacity and initial sector contents with null values. The modification would be obvious because one of ordinary skill in the art would be motivated to reduce the size of the virtual disk files (*see Page 21, Paragraph [0094]*).

As per **Claim 14**, the rejection of **Claim 7** is incorporated; however, Kedem and Han do not disclose:

- in which the source disk is a first virtual disk associated with a first virtual computer and the destination disk is a second virtual disk associated with a second virtual computer.

Bugnion discloses

- in which a source disk is a first virtual disk associated with a first virtual computer and a destination disk is a second virtual disk associated with a second virtual computer (*see Column 10: 5-7, "Disco virtualizes disks by providing a set of virtual disks that any virtual machine can mount."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Bugnion into the teaching of Kedem to modify Kedem's invention to include in which the source disk is a first virtual disk associated with a first virtual computer and the destination disk is a second virtual disk associated with a second virtual computer. The modification would be obvious because one of ordinary skill in the

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art would be motivated to utilize a virtual disk file to support different sharing and persistency models (see Bugnion – Column 10: 7-8).

As per **Claim 24**, the rejection of **Claim 21** is incorporated; however, Kedem and Han do not disclose:

- in which the destination image is a virtual disk file associated with a virtual computer.

Bugnion discloses:

- in which a destination image is a virtual disk file associated with a virtual computer (see Column 10: 5-7, “Disco virtualizes disks by providing a set of virtual disks that any virtual machine can mount.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Bugnion into the teaching of Kedem to modify Kedem’s invention to include in which the destination image is a virtual disk file associated with a virtual computer. The modification would be obvious because one of ordinary skill in the art would be motivated to utilize a virtual disk file to support different sharing and persistency models (see Bugnion – Column 10: 7-8).

As per **Claim 25**, the rejection of **Claim 24** is incorporated; however, Kedem and Han do not disclose:

- in which the first computer is a physical computer and the source disk is a physical disk associated with the physical computer.

Bugnion discloses:

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- in which a first computer is a physical computer and a source disk is a physical disk associated with the physical computer (*see Column 10: 5-7, "Disco virtualizes disks by providing a set of virtual disks that any virtual machine can mount."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Bugnion into the teaching of Kedem to modify Kedem's invention to include in which the first computer is a physical computer and the source disk is a physical disk associated with the physical computer. The modification would be obvious because one of ordinary skill in the art would be motivated to utilize a virtual disk file to support different sharing and persistency models (*see Bugnion – Column 10: 7-8*).

### ***Response to Arguments***

16. Applicant's arguments filed on March 31, 2009 have been fully considered, but they are not persuasive.

#### ***In the Remarks, Applicant argues:***

a) Applicants respectfully submit that Kedem does not disclose loop-back mounting a simulated source disk. In particular, as the Examiner has asserted, LDIM 202 "pretends" it is storage device 110 so that LDIM 202 is completely transparent to OS 102. However, Applicants respectfully submit that this is completely different from mounting a disk, and in addition, when the simulated disk is mounted, unlike Kedem where the OS is unaware of LDIM 202, in accordance with the invention of claim 3, the operating system in the second computer system is aware of the simulated disk.

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As set forth at paragraph [0167] of the specification of the present patent application, "Using the loop-back mounting method, the imaging server 2101 makes the source computer's source disk 1010 (i.e., the source disk) appear as a local disk from the server operating system's 2200 perspective; this local disk is referred to as "simulated source disk" 2210." And at paragraph [0168] of the specification, "A loop-back driver 2211N presents (simulates plug-in of) the simulated source disk to the server operating system 2200, causing it to detect the disk and instruct each of a set of installed and registered file system drivers 2212 to inspect the disk to find any file system that it recognizes. Note that the simulated source disk will appear to the server OS 2200 as any other new disk device, such as a Firewire or USB external hard disk that a user can hot-plug into a running computer. To the server OS, the simulated source disk will thus look like an actual physical device, and the OS will try to send IO requests to it. (Emphasis added)"

U.S. Patent No. 5,991,542 ("Han") cited by the Examiner describes mounting as follows at col. 4, lines 32-35: "The mounting of a storage medium refers to the process by which information is provided to the file management facility of a computer's operating system, so that the computer can access information on the storage medium." In addition, Han states the following regarding mounting at col. 4, line 67-col. 5, line 9: "Each time a volume is mounted, the file manager reads the volume information from the logical block and stores it in a predetermined area of the computer's working memory, e.g. its RAM. Once the file manager has retrieved and stored the volume information, the volume is considered to be mounted, and the file manager can access information contained in the remaining blocks of the volume. A volume

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becomes unmounted when the file manager releases the memory that was used to store the volume information."

As the Examiner can readily appreciate from the above, Kedem does not teach or disclose in any manner mounting a simulated source disk in the second computer so that the simulated source disk is accessible by the operating system as a local disk since Kedem does not teach mounting LDIM 202.

***Examiner's response:***

a) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem does not teach mounting the LDIM, the Examiner respectfully submits that Kedem clearly discloses mounting the LDIM (*see Column 3: 62-67 to Column 4: 1-3, "The purpose of the LDIM is to imitate the LPSD. That is, the LDIM, from the computer's perspective, appears exactly like the LPSD. More specifically, the LDIM functions to intercept and process requests that are intended to be received by the LPSD, which may not be in fact installed in the computer."; Column 8: 26-28, "To OS 102 and BIOS 104, LDIM 202 "pretends" that it is storage device 110. Thus, LDIM 202 is completely transparent to OS 102 and BIOS 104."; Column 9: 2-4, "In the former case, LDIM 202 emulates the selected image including the geometry of the image."*). Note that by emulating the disk image, the LDIM "pretends" to be the storage device and thus, appears exactly like the storage device from the operating system's perspective. Thus, one of ordinary skill in the art would readily comprehend that the LDIM acts as a proxy between the operating system and the storage



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device. It functions to intercept all requests from the operating system and retrieves the requested data from the storage device. As can be seen, the LDIM is clearly being “loop-back” mounted since it involves “the process of taking a file (disk image) and presenting it as a physical disk (emulating the disk image) to the operating system” as defined in paragraph [0152] of the specification. Furthermore, the LDIM provides storage device information to the operating system so that the operating system can access information on the storage device. Thus, one of ordinary skill in the art would readily comprehend that the LDIM is mounted as according to the definition of “mounting” provided by Han at column 4, lines 32-35, which states that “[t]he mounting of a storage medium refers to the process by which information is provided to the file management facility of a computer’s operating system, so that the computer can access information on the storage medium.”

Second, the Applicant is attempting to import limitations from the specification by referring to the specification. However, according to MPEP § 2111.01(II), it is improper to import claim limitations from the specification that are not part of the claims.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 102(e) with respect to Claim 3 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

b) In addition, Applicants respectfully submit that Kedem does not disclose configuring the simulated source disk as a proxy for the source disk by intercepting sector-based I/O requests and retrieving source disk data from the source disk according to the intercepted requests. In particular, in Kedem, LDIM 202 intercepts requests for a real storage device, i.e., storage device

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110, on computer 100, whereas, in accordance with the invention of claim 3, sector-based I/O requests aimed at a simulated disk are intercepted, and disk data are retrieved from a real disk on a second computer.

***Examiner's response:***

b) Examiner disagrees. With respect to the Applicant's assertion that Kedem does not disclose configuring the simulated source disk as a proxy for the source disk by intercepting sector-based I/O requests and retrieving source disk data from the source disk according to the intercepted requests, the Examiner respectfully submits that Kedem clearly discloses "configuring the simulated source disk as a proxy for the source disk by intercepting sector-based I/O requests directed to the simulated source disk and retrieving source disk data from the source disk according to the intercepted sector-based I/O requests" (*see Column 3: 62-67 to Column 4: 1-3, "The purpose of the LDIM is to imitate the LPSD. That is, the LDIM, from the computer's perspective, appears exactly like the LPSD. More specifically, the LDIM functions to intercept and process requests that are intended to be received by the LPSD, which may not be in fact installed in the computer."*; Column 9: 9-15, "... LDIM 202 functions to intercept requests (for example, read/write requests) that are intended to be received by storage device 110. After a master data image is selected, upon intercepting a read request, LDIM 202 is programmed to determine whether the cached data image or the selected master data image has the most up to date version of the requested data." and 28-32, "If LDIM 202 determines that the cached data image has the most up to date version of the requested data, then LDIM 202 retrieves the requested data from storage device 110 and passes the data back to the component or device

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*from which it received the request.”; Column 13: 66 and 67 to Column 14: 1 and 2, “Another approach is to add the interception and implementation of the LDIM onto the physical persistent storage device 110. This functionality would be added before the device’s controller (not shown) handles requests.”).* Note that, as discussed in the Examiner’s response (a) hereinabove, the LDIM emulates the disk image and appears exactly like the storage device from the operating system’s perspective and thus, acts as a proxy between the operating system and the storage device. It functions to intercept all requests from the operating system and retrieves the requested data from the storage device.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 102(e) with respect to Claim 3 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

c) In addition, Applicants respectfully submit that nothing in Kedem discloses, in any manner whatsoever, a step of "populating a destination image with extracted contents of the source disk in which the destination image has files, attributes, and structural relationships between files identical to files, attributes, and structural relationships between files associated with the source disk."

***Examiner’s response:***

c) Examiner disagrees. With respect to the Applicant’s assertion that nothing in Kedem discloses, in any manner whatsoever, a step of “populating a destination image with extracted contents of the source disk in which the destination image has files, attributes, and structural

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relationships between files identical to files, attributes, and structural relationships between files associated with the source disk,” the Examiner respectfully submits that Kedem clearly discloses “populating a destination image with extracted contents of the source disk in which the destination image has files, attributes, and structural relationships between files identical to files associated with the source disk” (*see Column 1: 29-38, “The contents of the hard disk (also referred to as the hard disk's "disk image" or "data image") define the user's personalized environment: ...” and 53-62, “When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image."”*). Note that a “disk image” contains the contents of a hard disk. Thus, one of ordinary skill in the art would readily comprehend that the “disk image” contains files, attributes, and structural relationships between the files identical to files, attributes, and structural relationships between the files of the hard disk.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 102(e) with respect to Claim 2 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

d) Applicants respectfully submit that claim 18 requires code to mount a simulated source disk in a second computer. As set forth above in response to the rejection of claim 3, even assuming (for sake of argument) that LDIM 202 is a simulated source disk (it is not), Kedem does not teach mounting a simulated source disk (see the discussion of mounting set forth above with respect to the rejection of claim 3). In addition, even assuming for sake of argument that

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LDIM 202 is a simulated source disk (it is not), Kedem does not disclose memory in the second computer including file system drivers to detect a file system of the simulated source disk.

***Examiner's response:***

d) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem does not teach mounting a simulated source disk, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (a) hereinabove.

Second, with respect to the Applicant's assertion that Kedem does not disclose memory in the second computer including file system drivers to detect a file system of the simulated source disk, the Examiner respectfully submits that Kedem clearly discloses memory in the second computer including file system drivers to detect a file system of the simulated source disk (*see Column 3: 62-67 to Column 4: 1-3, "The purpose of the LDIM is to imitate the LPSD. That is, the LDIM, from the computer's perspective, appears exactly like the LPSD. More specifically, the LDIM functions to intercept and process requests that are intended to be received by the LPSD, which may not be in fact installed in the computer."*; Column 8: 26-28, "To OS 102 and BIOS 104, LDIM 202 "pretends" that it is storage device 110. Thus, LDIM 202 is completely transparent to OS 102 and BIOS 104."; Column 9: 2-4, "In the former case, LDIM 202 emulates the selected image including the geometry of the image."). Note that, as discussed in the Examiner's response (a) hereinabove, the LDIM is mounted on the computer. Thus, one of ordinary skill in the art would readily comprehend that once the LDIM is mounted on the

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computer, the file system drivers stored on the memory of the computer would detect a file system of the LDIM.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 102(e) with respect to Claim 18 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

e) Claim 20 depends from claims 18 and 19. As such, Applicants submit that claim 20 is not anticipated by Kedem for the same reasons set forth above with respect to claims 18 and 19. In addition, Applicants respectfully submit that nothing in Kedem discloses, in any manner whatsoever, a step of "loading an imaging client program in the memory of the first computer, the imaging client program not being resident on the source disk. (Emphasis added)"

***Examiner's response:***

e) Examiner disagrees. With respect to the Applicant's assertion that nothing in Kedem discloses, in any manner whatsoever, a step of "loading an imaging client program in the memory of the first computer, the imaging client program not being resident on the source disk," the Examiner respectfully submits that Claim 20 does not recite the particular limitation of "loading an imaging client program in the memory of the first computer, the imaging client program not being resident on the source disk." Applicant is reminded that in order for such limitations to be considered, the claim language requires to specifically recite such limitations in the claims, otherwise broadest reasonable interpretations of the broadly claimed limitations are deemed to be proper.

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Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 102(e) with respect to Claim 20 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

f) Claim 6 requires "loading a secondary operating system in the memory of the first computer, said secondary operating system not being present on the source disk. (Emphasis added)" However, Gold teaches the opposite. For example, at col. 3, lines 52-62 Gold states: "According to a first aspect of the present invention there is provided a method of manufacture of an operating system master disk template for installing at least one operating system onto a computer entity, said manufacturing method comprising the steps of: building a primary operating system on a first partition of a data storage device; building a secondary operating system on a second partition of said data storage device; and building an installation component on a third partition of said data storage device. (Emphasis added)" In addition, at col. 3, line 63-col. 4, line 10, Gold states: "According to a second aspect of the present invention there is provided a method of manufacture of a computer entity, said computer entity comprising at least one data processor and at least one data storage device, said method characterized by the steps of: partitioning said data storage device into a plurality of partitions; installing a primary operating system onto a first said partition of said data storage device; installing a secondary operating system onto a secondary said partition of said data device; installing an initialization component onto a third partition of said data storage device; and after installation of said primary and secondary operating systems, deleting said installation component. (Emphasis added)" In further addition, at col. 4, lines 25-40, Gold states: "According to a third aspect of the present

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invention there is provided a method of producing a production version of an operating system for installation into a production version computer entity, said method comprising the steps of: creating an operating system master disk template having a plurality of partitions, wherein a primary operating system is stored on a first said partitions, a secondary operating system is stored on a second said partition, and an installation component is stored on a third said partition; loading said master disk template into a mastering computer entity to create an image of said master disk template on said mastering computer entity; and replicating said master disk image by loading said master disk image from said mastering computer entity onto said production computer entity. (Emphasis added)"

Applicants respectfully submit that even if a person of ordinary skill in the art were to combine Kedem and Gold in the manner suggested by the Examiner, that person would not arrive at the invention of claim 6 at least because that person would store a second operating system on the source disk. As such, Applicants respectfully submit that claim 6 is patentable over Kedem in view of Gold.

***Examiner's response:***

f) Examiner disagrees. With respect to the Applicant's assertion that the combination of Kedem and Gold would not arrive at the invention of Claim 6 at least because one of ordinary skill in the art would store a second operating system on the source disk, the Examiner respectfully submits that Gold clearly discloses storing a second operating system on a hard disk (*see Figure 4; Column 3: 23-28, "A utility can then be used to reset a system identification of the computer entity, before switching to a secondary operating system to complete a build process."*)



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*and 38-40, "A build process under control of a secondary "emergency" operating system can copy a fully installed primary operating system onto an operating system back-up volume.").*

Note that Figure 4 of Gold clearly illustrates that the secondary "emergency" operating system is stored on a system disk. Thus, by incorporating the teaching Gold into the teaching of Kedem, one of ordinary skill in the art would readily comprehend that the second operating system could be installed on a hard disk in the server (RDIM) of Kedem.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 6 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

g) Applicants respectfully submit that Kedem does not teach or disclose in any manner loop-back mounting a simulated source disk in the second computer (as required by claim 3 from which claim 7 depends) as discussed above with respect to the rejection of claim 3. Further, Applicants respectfully submit that Kedem does not teach or disclose in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk as required by claim 7. In particular, Kedem does not teach any simulated destination disk. However, even if LDIM 202 were such a simulated destination disk (as the Examiner asserts), Kedem does not teach or disclose that it is mounted in an uninitialized state. Further, as described above with respect to the rejection of claim 3, Kedem does not teach or disclose mounting LDIM 202.

The Examiner asserts that Kedem discloses "copying files of at least one file system of the simulated source disk to the corresponding file system of the simulated destination disk" by

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the language "It is envisioned that a user who uses the DIMS would initially copy the data image stored on storage device 110 onto RPSD 206 and then always select that image as the master data image." However, neither storage device 110 nor RPSD is a simulated source disk or a simulated destination disk.

***Examiner's response:***

g) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem does not teach or disclose in any manner loop-back mounting a simulated source disk in the second computer, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (a) hereinabove.

Second, with respect to the Applicant's assertion that Kedem does not teach or disclose in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk, the Examiner respectfully submits that Kedem clearly discloses "mounting the destination image in an uninitialized state in the second computer as a simulated destination disk" (*see Column 8: 63-67 to Column 9: 1, "The mini-booter displays the list of available master data images and prompts the user to select one. The mini-booter communicates the selection to LDIM 202 and then either reboots the computer or resets the BIOS's disk geometry table to the geometry of the selected master data image."*). Note that the user selects a master data image (destination image) from the list of available master data images to be mounted on the LDIM. The LDIM reboots the computer or resets the BIOS' disk geometry table

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to allow the selected master data image to be mounted. Thus, one of ordinary skill in the art would readily comprehend that rebooting the computer or resetting the BIOS' disk geometry table would result in an uninitialized state of the computer.

Third, with respect to the Applicant's assertion that neither storage device nor RPSD is a simulated source disk or a simulated destination disk, the Examiner respectfully submits that Kedem clearly discloses a simulated source disk (*see Figure 2: 202*) and a simulated destination disk (*see Figure 2: 206*).

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 7 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

h) The Examiner asserts that Han teaches "formatting the simulated destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk" at col. 4, lines 64-67 which (only) states that a volume is formatted when it is initialized. Applicants respectfully submit that this assertion completely omits the fact that neither Kedem nor Han teaches or discloses "formatting the simulated destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk. (Emphasis added)"

***Examiner's response:***

h) Examiner disagrees. With respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses "formatting the simulated destination image to have the same

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partitioning and file system as the simulated source disk and thus of the source disk,” the Examiner respectfully submits that Han clearly discloses “formatting a simulated destination image to have the same partitioning and file system as a simulated source disk and thus of a source disk” (see Column 4: 37-39, “In essence, a volume can be any piece of a storage medium, such as a disk, which is formatted to contain files. A volume can be an entire disk, or only part of a disk.” and 61-67, “The volume information in logical block 2 comprises various fields that are used by the operating system's file management facility, such as the volume name, its size, and the number of files on the volume. This information is initially created when the volume is initialized, or formatted, and modified thereafter whenever the file management system writes information to the volume.”). Note that the volume of the logical block of the disk (simulated source disk) is formatted to create the volume information (simulated destination image) that is used by the operating system's file management facility.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 7 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

i) Claim 12 depends from claim 7. As such, Applicants respectfully submit that claim 12 is patentable over Kedem in view of Han for the same reasons set forth above with respect to claim 7. In addition, neither Kedem nor Han teaches or discloses a virtual disk (see the specification at paragraphs (0093) and (0150), among others, referring to virtual disks). As such, even if a person of ordinary skill in the art were to combine Kedem and Han in the manner suggested by the Examiner, that person would not arrive at the invention of claim 12 because Kedem and Han do

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not disclose the missing element, i.e., the source virtual disk, required by claim 12. Hence, nothing in Kedem or Han would make the invention of claim 12 obvious.

***Examiner's response:***

i) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem and Han do not disclose the source virtual disk, the Examiner respectfully submits that Kedem clearly discloses a source virtual disk (*see Column 1: 53-62, "When the persistent storage device is a hard disk, the persistent storage device data image will frequently be called a "disk image.""*). Note that a "disk image" contains the contents of a hard disk. Thus, one of ordinary skill in the art would readily comprehend that the "disk image" is essentially a source virtual disk.

Second, the Applicant is attempting to import limitations from the specification by referring to the specification. However, according to MPEP § 2111.01(II), it is improper to import claim limitations from the specification that are not part of the claims.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 12 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

j) Claim 13 depends from claims 7 and 12. As such, Applicants respectfully submit that claim 13 is patentable over Kedem in view of Han for the same reasons set forth above with respect to claims 7 and 12. In addition, neither Kedem nor Han teaches, discloses or suggests in

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any manner creating an image of a virtual disk on a physical disk. Hence, nothing in Kedem or Han would make the invention of claim 13 obvious.

***Examiner's response:***

j) Examiner disagrees. With respect to the Applicant's assertion that neither Kedem nor Han teaches, discloses or suggests in any manner creating an image of a virtual disk on a physical disk, the Examiner respectfully submits that Kedem clearly discloses "in which the destination disk is a physical disk" (*see Figure 1: 110*).

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 13 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

k) Applicants respectfully submit that claim 16 is patentable over Kedem in view of Han for at least the following reasons: (a) neither Kedem nor Han teaches or discloses in any manner mounting a simulated source disk in the second computer as discussed above with respect to the rejection of claim 7; and (b) neither Kedem nor Han teaches or discloses in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk as discussed above with respect to the rejection of claim 7. Hence, nothing in Kedem or Han would make the invention of claim 16 obvious.

***Examiner's response:***

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k) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses in any manner mounting a simulated source disk in the second computer, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (a) hereinabove.

Second, with respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses in any manner mounting the destination image in an uninitialized state in the second computer, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (g) hereinabove.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 16 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

l) Claim 22 depends from claims 18 and 21. As such, Applicants respectfully submit that claim 22 is patentable over Kedem in view of Han for the same reasons set forth above with respect to claims 18 and 21. In addition, as set forth above in regard to the rejection of claim 12, neither Kedem nor Han teaches or discloses a virtual disk (see the specification at paragraphs 0093 and 0150, among others, referring to virtual disks). As such, even if a person of ordinary skill in the art were to combine Kedem and Han in the manner suggested by the Examiner, that person would not arrive at the invention of claim 22 because Kedem and Han do not disclose the

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missing element, i.e., the source virtual disk, required by claim 22. Hence, nothing in Kedem or Han would make the invention of claim 22 obvious.

***Examiner's response:***

l) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem and Han do not disclose the source virtual disk, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (i) hereinabove.

Second, the Applicant is attempting to import limitations from the specification by referring to the specification. However, according to MPEP § 2111.01(II), it is improper to import claim limitations from the specification that are not part of the claims.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 22 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

m) Claim 23 depends from claims 18, 21 and 22. As such, Applicants respectfully submit that claim 23 is patentable over Kedem in view of Han for the same reasons set forth above with respect to claims 18, 21 and 22. In addition, neither Kedem nor Han teaches, discloses or suggests in any manner creating an image of a virtual disk on a physical disk. Hence, nothing in Kedem or Han would make the invention of claim 23 obvious.



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***Examiner's response:***

m) Examiner disagrees. With respect to the Applicant's assertion that neither Kedem nor Han teaches, discloses or suggests in any manner creating an image of a virtual disk on a physical disk, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (j) hereinabove.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 23 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

n) Applicants respectfully submit that claim 27 is patentable over Kedem in view of Han for at least the following reasons: (a) neither Kedem nor Han teaches or discloses in any manner mounting a simulated source disk in the second computer as discussed above with respect to the rejection of claim 7; and (b) neither Kedem nor Han teaches or discloses in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk as discussed above with respect to the rejection of claim 7. Hence, nothing in Kedem or Han would make the invention of claim 27 obvious.

***Examiner's response:***

n) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses in any manner mounting a simulated source disk in the second computer, the Examiner

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respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (a) hereinabove.

Second, with respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (g) hereinabove.

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 27 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

o) Claim 9 depends from claim 7. As such, Applicants repeat the arguments set forth above with respect to Kedem and Han. Namely, Applicants respectfully submit that Kedem does not teach or disclose in any manner loop-back mounting a simulated source disk in the second computer (as required by claim 3 from which claims 7 and 9 depend) as discussed above with respect to the rejection of claim 3. Further, Applicants respectfully submit that Kedem does not teach or disclose in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk as required by claims 7 and 9. In particular, Kedem does not teach any simulated destination disk. However, even if LDIM 202 is such a simulated destination disk (as the Examiner asserts), Kedem does not teach or disclose that it is mounted in an uninitialized state. Further, as described above with respect to the rejection of claim 3, Kedem does not teach or disclose mounting LDIM 202.

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As additionally set forth above in response to the rejection of claim 7, neither Kedem nor Han teaches or discloses "formatting the simulated destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk. (Emphasis added)"

...

Lastly, a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file for the reasons set forth in the specification of the pending patent application, namely, as set forth at paragraph (0150): "Selecting virtual disks as a common image file format is not an obvious choice, since virtual disks use a sector-based format, and this type of format is known to have issues when used as a disk image format, as the discussion above on prior art explains. Not surprisingly, no contemporary disk imaging system uses virtual disks as image files." As additionally set forth in paragraphs (0014), (0015) and (0023): "A first disadvantage of the sector-based approach is, when an image is deployed, the destination disk must be at least as large as the original disk since the file system metadata on the original disk may encode the disk's capacity and assume that it never changes. This metadata is captured into the image file and copied to the destination disk. If the destination disk is smaller than the source disk, some sectors that the metadata assume exist may not exist on the destination disk, resulting in an inconsistent file system. Furthermore, if the destination disk is larger than the source disk, the deployed file system may not be able to take advantage of the additional space, since its metadata would assume that the disk has a smaller capacity. Another disadvantage of a sector-based format is its inefficiency. A disk may have a large number of free sectors, that is, sectors that are not used as data or metadata, and thus have no useful content. These sectors may be

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scattered all over the disk, and may be difficult to identify because they generally contain an undefined set of bytes. A free sector's content is undefined because the sector may have been used earlier as data or metadata, then released after a file or folder was deleted. Most file system drivers don't erase (i.e., fill with zeros) freed sectors. A sector-based image format is therefore inefficient because it may include a disk's unused sectors. ... In summary, sector-based disk image formats are subject to two main limitations: the capacity matching problem, where the destination disk of deploy operation must be as large or larger than the source disk used to create the image, and the efficiency problem, where the image file may contain useless sectors, which unnecessarily increases its size and the time it takes to capture or deploy.

***Examiner's response:***

o) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, with respect to the Applicant's assertion that Kedem does not teach or disclose in any manner loop-back mounting a simulated source disk in the second computer, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (a) hereinabove.

Second, with respect to the Applicant's assertion that Kedem does not teach or disclose in any manner mounting the destination image in an uninitialized state in the second computer as a simulated destination disk, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (g) hereinabove.

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Third, with respect to the Applicant's assertion that neither Kedem nor Han teaches or discloses "formatting the simulated destination image to have the same partitioning and file system as the simulated source disk and thus of the source disk," the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (h) hereinabove.

Fourth, without acquiescing to the Applicant's assertion that a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file for the reasons set forth in the specification of the pending patent application, the Examiner first submits that the Applicant is attempting to import limitations from the specification by referring to the specification. However, according to MPEP § 2111.01(II), it is improper to import claim limitations from the specification that are not part of the claims.

Fifth, with respect to the Applicant's assertion that a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file for the reasons set forth in the specification of the pending patent application, the Examiner respectfully submits that one of ordinary skill in the art would be motivated to have a destination image as a virtual disk file in order to support different sharing and persistency models by configuring the virtual disk file (*see Bugnion – Column 10: 7-8*).

Therefore, for at least the reasons set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 9 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

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p) Claim 14 depends from claim 7. As such, Applicants respectfully submit that claim 14 is patentable over Kedem in view of Han and further in view of Bugnion for the same reasons set forth above with respect to the rejection of claim 7. In addition, a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file for the reasons set forth above in response to the rejection of claim 9.

***Examiner's response:***

p) Examiner disagrees. With respect to the Applicant's assertion that a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (o) hereinabove.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 14 is proper and therefore, maintained.

***In the Remarks, Applicant argues:***

q) Claim 24 depends from claim 21. As such, Applicants respectfully submit that claim 24 is patentable over Kedem in view of Han and further in view of Bugnion for the same reasons set forth above with respect to the rejection of claim 21. In addition, a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file for the reasons set forth above in response to the rejection of claim 9.

***Examiner's response:***

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q) Examiner disagrees. With respect to the Applicant's assertion that a person of ordinary skill in the art would not be motivated to have a destination image as a virtual disk file, the Examiner respectfully submits that the Examiner has addressed the Applicant's argument in the Examiner's response (o) hereinabove.

Therefore, for at least the reason set forth above, the rejection made under 35 U.S.C. § 103(a) with respect to Claim 24 is proper and therefore, maintained.

### ***Conclusion***

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Qing Chen whose telephone number is 571-270-1071. The

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Examiner can normally be reached on Monday through Thursday from 7:30 AM to 4:00 PM.

The Examiner can also be reached on alternate Fridays.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wei Zhen, can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Q. C./

Examiner, Art Unit 2191

/Wei Y Zhen/

Supervisory Patent Examiner, Art Unit 2191